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PROFILING OVERWEIGHT PATIENTS IN THE U.S. NAVY:  
HEALTH CONDITIONS AND COSTS

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## SUMMARY

### Problem

The U.S.A. has the distinction of being the "fattest" nation in the world, with an estimated 34 million obese citizens. Of grave concern is the reported finding that obesity contributes to 20% of the annual mortality rate, primarily for such conditions as diabetes mellitus, digestive diseases, coronary heart disease, and cerebrovascular disease. In 1982, the Navy initiated the "Health and Physical Readiness Program" in order to establish body fat percentages and physical conditioning standards and to provide Navy personnel with weight reduction and other health promotion programs. Participation in such programs is expected to help overweight personnel solve their weight problems and reduce the risks of obesity-related conditions.

### Objectives

The purpose of this study was (1) to identify the health conditions recorded in a sample of U.S. Navy enlisted men who had been diagnosed as obese during one or more of their admissions to a naval hospital from 1974 through 1984, (2) to determine whether these disorders correspond with those reported in the scientific literature, and (3) to examine the obesity-related costs in terms of numbers of days hospitalized and career outcome. *Keywords: Obesity, Hypertension, Diabetes Mellitus, Gout, Coronary Heart Disease, Gallbladder Disease, Physical Disability, Health Promotion* (JE)

The patient population consisted of 518 U.S. Navy enlisted men who were given a primary diagnosis of obesity and 1,092 who received a secondary or additional diagnosis of obesity on at least one of their inpatient medical records between 1974 and 1984. A 10% sample of Navy male patients, all of whom had not been diagnosed as obese, was selected as a comparison group ( $n = 30,829$ ). All diagnoses (ICD-9) for each hospitalization were included in the data compilations; however, each unique diagnosis was only counted once. Frequency and percentage distributions were compiled for each of the two samples and by age interval (20 to 29 years, 30 to 39 years, and older than 40 years) for the 16 major diagnostic categories and several specific diagnoses as well as numbers of days hospitalized and type of Navy separation. Univariate analyses were conducted to establish whether hospitalized obese men accounted for significantly higher mean numbers of days hospitalized or percentages of disability separations than controls.

### Results

Almost one-third of the obese sample was hospitalized with a primary diagnosis of obesity, which accounted for more than 10,000 days hospitalized. Other specific disorders that represented a large proportion of all health problems among obese patients at all ages included hypertension, diabetes mellitus, gout, respiratory symptoms, and gallbladder disorders as well as chronic ischemic heart disease beginning at age 30. Also noteworthy was the high percentage among the overweight of hospitalizations for alcoholism, their second-ranked condition, which was the leading health problem in the control sample. In both samples, alcoholism was listed in the top four specific diagnoses for each age interval and accounted for 10.0% of all days hospitalized. Obese patients had a significantly higher overall mean number of days hospitalized than controls. Other findings showed that obese patients had relatively high percentages of physical disabilities, primarily for diabetes mellitus, chronic ischemic heart disease, and hypertension.

### Conclusions

The conditions reported in the scientific literature as obesity related were identical to those noted among obese patients in this study. The relatively high percentage (almost 10%) of 20- to 29-year-old obese patients diagnosed with gout, hypertension, gallbladder disorders, and diabetes mellitus suggests that efforts should be made to initiate prevention and weight reduction programs for men in their 20s. Also, the percentage of hospitalizations for chronic heart disease among 30- to 39-year-old obese patients was quite high which corresponded with other research reporting that obesity predisposes to premature coronary heart disease.

### Recommendations

Results of this study support the implementation of the weight reduction programs that were developed as part of the "Health and Physical Readiness Program." The timing of assigning individuals to such programs is of importance—before any adverse health effects are manifest. In assigning overweight individuals to a weight reduction program at an early phase of the excess weight condition, therefore, it seems likely that the incidence of obesity-related conditions will decrease as will the overall costs of inpatient care and disability separations.

Profiling Overweight Patients in the U.S. Navy:  
Health Conditions and Costs

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Recently, it was learned that the United States is the "fattest" nation in the world; the number of obese people has steadily increased over the years from 28.8 million in the late 1970s to 34 million as reported in a more current study.<sup>1</sup> The problem of obesity has persisted even though millions of dollars have been spent since the 1940s on creating solutions and increasing awareness. In 1986 alone, the commitment to studies of obesity, anorexia, and appetite control by the National Institutes of Health (NIH) totaled \$29 million.<sup>2</sup> The relatively poor return on such an investment is reflected by the discouraging long-term cure rate for obesity of less than 8%.<sup>3</sup> As stated by Mann,<sup>4</sup> "Obesity is a relatively incurable disorder."

Of grave concern is the reported finding that obesity directly or indirectly contributes to 20% of the annual mortality rate in the U.S.A.<sup>5</sup> The highest mortality ratios are for diabetes mellitus, followed by digestive diseases, coronary heart disease, and cerebrovascular disease.<sup>6</sup> Researchers convened by the NIH<sup>7</sup> report that obesity-related conditions include hypertension, noninsulin-dependent diabetes mellitus, elevated cholesterol, certain cancers, and other medical problems; also identified are gallbladder disease, gout, arthritis, respiratory impairment, pregnancy complications, cutaneous disease, and possibly immunologic impairment.<sup>8-9</sup>

Research results on the relationship of obesity and coronary heart disease, however, are not definitive in that obese persons are more likely to have an unfavorable heart disease risk but being overweight is not as consistently predictive of heart disease as would be hypothesized.<sup>10</sup> Other researchers conclude that the degree of obesity is an important long-term predictor of cardiovascular disease, and obesity predisposes individuals to premature cardiovascular disease.<sup>11-13</sup> To clarify this association, researchers<sup>7,14-16</sup> recommend that efforts should be directed toward understanding the relationship of coronary heart disease not only with obesity but also with the distribution of fat deposits.

The problem of obesity also concerns officials of the U.S. Navy. One important reason centers on the responsibility that the Navy Medical Department has for providing health care for active duty personnel, which entails not only care provision but also accurate planning for the construction and staffing of inpatient and outpatient medical care facilities. As discussed above, obese people account for larger proportions of morbidity and mortality rates than their nonobese counterparts; as a result, they would be expected to have higher rates of health care utilization. Another reason pertains to the necessity of maintaining a high level of physical readiness which requires that all members of the Navy meet specified standards of body fat percentages and physical fitness after beginning active service as healthy youths of acceptable weight. Adhering to these standards is the basis of military personnel readiness in that men and women are not to be encumbered by excess fat deposits and will be ready for a combat role if necessary.<sup>17</sup> In 1982, the Navy initiated the "Health and Physical Readiness Program" in order to establish body composition and physical conditioning standards, to assess all Navy personnel against these standards, and to provide Navy personnel with weight reduction and other health promotion programs if they are unable to meet the requirements. Participation in these programs is expected to help overweight men and women solve their weight problems and reduce the risks of obesity-related conditions and premature cardiovascular disease.

The purpose of this study was (1) to identify the health conditions recorded in a sample of U.S. Navy enlisted men who had been diagnosed as obese during one or more of their admissions to a naval hospital from 1974 through 1984, (2) to determine whether these disorders correspond with those reported in the scientific literature, and (3) to examine the costs associated with these conditions in terms of numbers of days hospitalized and percentages of physical disability separations. The specific questions posed are: What are the most frequently observed diagnoses recorded in three Navy age-specific hospitalized obese samples? What specific diagnoses account for the highest percentages and mean numbers of days hospitalized? What are the most frequently observed reasons for being separated or retired from the Navy in these obese samples? Do the rank orderings of diagnoses and separations of the obese samples differ from those of male samples who also had been hospitalized during the same time frame but had not been diagnosed as obese?

### Method

#### **Patients**

The data selected for this study were extracted from the Naval Medical Inpatient file, which is a computerized compilation of hospital records collected from all naval medical inpatient facilities throughout the world, and the Naval Service History file, which contains demographic, career, and service history information on all naval personnel. Both files contain information dating back to 1965.<sup>18</sup> The study population consisted of 1,610 U.S. Navy enlisted men who were identified as obese in that 518 received a primary diagnosis of obesity and 1,092 were given a secondary or additional diagnosis of obesity on at least one of their inpatient medical records between 1974 and 1984. A 10% sample of Navy male patients, all of whom had not been diagnosed as obese, was selected as a comparison group which was accomplished by extracting every enlisted medical inpatient record that had a Social Security number ending in "9" ( $n = 30,829$ ).

For both samples, the following variables were selected from the medical inpatient file: all diagnoses (ICD-9) for each hospitalization, age at the time of admission, total number of days hospitalized for each primary diagnosis, and the underlying cause of death. All diagnoses for each hospitalization were included in the data compilations for both obese and comparison groups in order to identify all health-related conditions; however, each unique diagnosis was only counted once. Information obtained from the Naval Service History file included dates of service entry and separation, type of separation, and birth date.

#### **Procedure**

To control for the effects of age, the two samples were divided into the three age intervals of 20 to 29 years, 30 to 39 years, and 40 years of age and older. Frequency and percentage distributions were compiled for each of the two samples and by age interval for the 16 major diagnostic categories and several specific diagnoses as well as numbers of days hospitalized and type of separation from the Navy. Comparisons were conducted to establish whether or not hospitalized obese men accounted for higher proportions of days hospitalized or disability separations than hospitalized controls. A  $z$  test of the significance of differences between proportions was performed to

determine the level of statistical significance. A  $t$ -test value was computed between samples on mean numbers of days hospitalized for the leading diagnoses. Results of these analyses indicated whether the mean numbers of hospital days were significantly higher among obese than other patients.

### Results

#### Categories and Diagnoses among Hospitalized Obese and Control Enlisted Men

For the obese sample, a rank ordering of the 16 major diagnostic categories identified the following top six, which accounted for 65.5% of all diagnoses: diseases of the circulatory system, mental disorders, accidental injuries, diseases of the digestive system, diseases of the musculoskeletal system, and endocrine and metabolic disorders. The rank orderings of these diagnostic categories as well as those for specific conditions by sample are presented in Table 1. In examining the frequency and percentage distributions of specific diagnoses, the health problems noted most frequently during 1974 to 1984 (a total of 31.8%) included: hypertension, alcoholism, diabetes mellitus, symptoms referable to the respiratory system, chronic ischemic heart disease, hernia, vertebrogenic pain syndrome, cellulitis, gout, acute myocardial infarction, and gallbladder disease.

For the comparison patient group across all ages, a rank ordering of the top six major diagnostic categories represented 71.2% of all diagnoses: accidental injuries, mental disorders, diseases of the digestive system, diseases of the musculoskeletal system, diseases of the respiratory system, and infective and parasitic diseases (also shown in Table 1). The 11 leading specific reasons for being hospitalized included alcoholism, hernia, personality disorders, internal derangement of the joint, cellulitis, transient situational disturbances, other diseases of the joint, concussion, deflected nasal septum, vertebrogenic pain syndrome, and dislocation of the knee (a total of 23.4%).

#### Comparisons of Diagnoses by Age Interval among Hospitalized Enlisted Men

As shown in Table 2, the most frequently recorded unique health conditions among 20- to 29-year-old obese patients were alcoholism, hypertension, personality disorders, and other diseases of the joint. Among 30- to 39-year-olds, the leading problems consisted of hypertension, alcoholism,

TABLE 1

RANK ORDERING OF MAJOR DIAGNOSTIC CATEGORIES AND SPECIFIC DIAGNOSES  
IN TWO SAMPLES OF HOSPITALIZED NAVY ENLISTED MEN, 1974-1984

Major Diagnostic Category among Obese Patients	Major Diagnostic Category among Other Patients
1. Diseases of the Circulatory System 2. Mental Disorders 3. Accidental Injuries 4. Diseases of the Digestive System 5. Diseases of the Musculoskeletal System 6. Endocrine, Nutritional, and Metabolic Diseases	1. Accidental Injuries 2. Mental Disorders 3. Diseases of the Digestive System 4. Diseases of the Musculoskeletal System 5. Diseases of the Respiratory System 6. Infective and Parasitic Diseases
Specific Diagnoses among Obese Patients	Specific Diagnoses among Other Patients
1. Essential benign hypertension 2. Alcoholism 3. Diabetes mellitus 4. Symptoms referable to the respiratory system 5. Chronic ischemic heart disease 6. Hernia 7. Vertebrogenic pain syndrome 8. Other cellulitis/abscess 9. Gout 10. Acute myocardial infarction 11. Gallbladder disease	1. Alcoholism 2. Hernia 3. Personality disorders 4. Internal derangement of joint 5. Other cellulitis/abscess 6. Transient situational disturbances 7. Other diseases of joint 8. Concussion 9. Deflected nasal septum 10. Vertebrogenic pain syndrome 11. Dislocation of knee

diabetes mellitus, and chronic ischemic heart disease. The diagnoses that accounted for the largest proportions of the total for the oldest group included hypertension, diabetes mellitus, chronic ischemic heart disease, and alcoholism.

Among control patients aged 20 to 29, the rank-ordered diagnoses consisted of alcoholism, personality disorders, hernia, and internal derangement of the joint. The diagnoses among 30- to 39-year-olds controls included alcoholism, hernia, internal derangement of the joint, and vertebrogenic pain syndrome. Control group patients over the age of 40 had the highest percentages of all diagnoses for alcoholism, hernia, hypertension, and symptoms

**TABLE 2**  
**RANK ORDERING OF LEADING REASONS FOR AND PERCENTAGES OF HOSPITALIZATIONS  
 AMONG OBESE AND OTHER NAVY PATIENTS, 1974-1984**

<u>Hospitalized Obese Navy Enlisted Men</u>		
<u>20- to 29-year-olds</u>	<u>30- to 39-year-olds</u>	<u>&gt; 40 years</u>
Alcoholism (7.4%)	Hypertension (9.1%)	Hypertension (11.0%)
Hypertension (6.3%)	Alcoholism (5.0%)	Diabetes mellitus (6.3%)
Personality dis- orders (2.8%)	Diabetes mellitus (4.9%)	Chronic ischemic heart disease (4.6%)
Other diseases of the joint (2.2%)	Chronic ischemic heart disease (2.6%)	Alcoholism (3.7%)
<u>Other Hospitalized Navy Enlisted Men</u>		
<u>20- to 29-year-olds</u>	<u>30- to 39-year-olds</u>	<u>&gt; 40 years</u>
Alcoholism (5.2%)	Alcoholism (8.6%)	Alcoholism (5.4%)
Personality dis- orders (3.0%)	Hernia (3.6%)	Hernia (4.7%)
Hernia (2.4%)	Internal derange- ment of joint (1.8%)	Hypertension (2.9%)
Internal derange- ment of joint (2.3%)	Vertebrogenic pain syndrome (1.8%)	Symptoms referable to the respiratory system (2.8%)

referable to the respiratory system. These age-specific diagnoses also are listed in Table 2.

#### Costs of Obesity

The sample of obese patients had a total of 3,471 admissions and 52,314 days hospitalized during 1974 through 1984 ( $\bar{x} = 15.1$  days hospitalized;  $SD = 22.6$ ); control patients had 35,409 admissions and 393,602 days of inpatient treatment ( $\bar{x} = 11.1$  days hospitalized;  $SD = 20.9$ ). Results of a  $t$ -test analysis yielded a highly significant difference between these means ( $t = 10.02$ ;  $p < 0.001$ ). The diagnoses presented in Table 3 included the ten disorders (all primary diagnoses) with the highest numbers of days hospitalized in the obese sample as well as values for the control sample and  $t$ -test results. Almost one-half (45.1%) of all days hospitalized among the obese were for obesity, alcoholism, chronic ischemic heart disease, hypertension, and diabetes mellitus. Comparisons between samples revealed that 20.2% of all days hospitalized among obese patients was for obesity as contrasted with 20.7% of all days among controls for accidental injuries (7.3%

TABLE 3

RANK ORDERING OF DIAGNOSES WITH HIGHEST DAYS HOSPITALIZED  
AMONG OBESE NAVY PATIENTS AS COMPARED WITH CONTROL PATIENTS, 1974-1984

Diagnosis	Hospital Admissions						Days Hospitalized					
	Obese			Control			Obese			Control		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Obesity	548	15.8	0	0.0	10,575	20.2	19.3	0	0.0	0.0	0.0	0.0
Alcoholism	250	7.2	2,597	7.3	5,253	10.0	21.0	39,098	9.9	15.1	4.41**	
Chronic ischemic heart disease	107	3.1	148	0.4	3,391	6.5	31.7	2,858	0.7	19.3	2.76*	
Essential benign hypertension	186	5.4	103	0.3	2,481	4.7	13.3	1,256	0.3	12.2	0.44	
Diabetes mellitus	137	3.9	141	0.4	1,902	3.6	13.9	2,162	0.5	15.3	0.54	
Vertebralogenic pain syndrome	72	2.1	566	1.6	1,114	2.1	15.5	6,704	1.7	11.8	1.09	
Displacement of intervertebral disc	36	1.0	372	1.1	1,074	2.1	29.8	10,086	2.6	27.1	0.51	
Acute myocardial infarction	41	1.2	84	0.2	1,059	2.0	25.6	1,801	0.5	21.4	0.73	
Other cellulitis/abscess	86	2.5	769	2.2	940	1.8	10.9	5,050	1.3	6.6	3.59**	
Symptoms of respiratory system	92	2.7	246	0.7	683	1.3	7.4	1,499	0.4	6.1	1.62	
Subtotal	1,555	44.8	5,026	14.2	28,463	54.4	18.3	70,514	17.9	14.0	-	
Total	3,471	100.0	35,408	100.0	52,314	100.0	15.1	393,602	100.0	11.1	10.02**	

\*p &lt; 0.05

\*\*p &lt; 0.01

in the obese sample). Approximately 10.0% of all days hospitalized in both samples were for alcoholism.

Diagnoses with the highest mean number of hospital days among obese patients included chronic ischemic heart disease, displacement of the intervertebral disc, acute myocardial infarction, alcoholism, and obesity. Results of the t-test analyses presented in Table 3 showed that the mean number of days hospitalized differed significantly between samples for alcoholism, cellulitis, and chronic ischemic heart disease.

As shown in Table 4, the highest numbers of days hospitalized for the control group were concentrated in the two major categories of mental disorders and musculoskeletal disorders: alcoholism, schizophrenia, and personality disorders as well as internal derangement of the joint and displacement of the intervertebral disc. These conditions accounted for 23.0% of all hospital days among controls. Higher percentages of total days hospitalized among controls than obese patients were observed for schizophrenia and personality disorders. Also noted was the finding that the highest mean number of hospital days for controls occurred for schizophrenia, followed by displacement of the intervertebral disc, fractures of the tibia and fibula, and neuroses. Of the top ten diagnoses in the control group, the only significant difference between samples for mean days hospitalized was the higher mean among obese patients for alcoholism.

In Table 5 are presented the frequency and percentage distributions of separations and deaths for both samples. The proportions of obese individuals who were separated or retired with a physical disability were significantly larger than those for the comparison group for each age interval. Diagnoses associated with a physical disability among obese patients included diabetes mellitus, chronic ischemic heart disease, and hypertension. On the other hand, percentages of separations for unsuitability and other reasons of noneffectiveness were significantly higher for control than obese patients, except among the oldest patients. For comparisons of the underlying cause of death between samples, the only difference was that more obese than control patients died of circulatory diseases.

TABLE 4

RANK ORDERING OF DIAGNOSES WITH HIGHEST DAYS HOSPITALIZED  
AMONG CONTROL NAVY PATIENTS AS COMPARED WITH OBESE PATIENTS, 1974-1984

Diagnosis	Hospital Admissions				Days Hospitalized			
	Obese		Control		Obese		Control	
	No.	%	No.	%	No.	%	No.	%
Alcoholism	250	7.2	2,597	7.3	5,253	10.0	21.0	39,098
Schizophrenia	3	0.1	407	1.1	191	0.4	63.7	19,480
Internal derangement of joint	39	1.1	979	2.7	489	0.9	12.5	11,677
Personality disorders	21	0.6	818	2.3	240	0.5	11.4	10,288
Displacement of intervertebral disc	36	1.0	372	1.1	1,074	2.1	29.8	10,086
Inguinal hernia without mention of obstruction	50	1.4	1,071	3.0	326	0.6	6.5	9,053
Fracture of tibia and fibula	15	0.4	316	0.9	532	1.0	35.5	8,264
Neuroses	25	0.7	362	1.0	584	1.1	23.4	7,391
Dislocation of knee	35	1.0	510	1.4	480	0.9	13.7	6,899
Vertebrogenic pain syndrome	72	2.1	566	1.6	1,114	2.1	15.5	6,704
Subtotal	546	15.7	7,988	22.6	10,283	19.7	18.8	128,940
Total	3,471	100.0	35,409	100.0	52,314	100.0	15.1	393,602
								100.0
								11.1
								10.02**

\*p &lt; 0.001

TABLE 5

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SEPARATIONS AND DEATHS  
AMONG OBESIVE AND CONTROL HOSPITALIZED NAVY ENLISTED MEN BY AGE INTERVAL, 1974-1984

Separation/Retirement	20-29 years of age			30-39 years of age			>40 years and older			
	Obese		Control	Obese		Control	Obese		Control	
	No.	%	No.	%	No.	%	No.	%	No.	
Physical disability separations and retirements	66	17.9*	1,976	13.9	108	25.6**	424	18.1	72	27.7**
Completion of active duty obligation, honorable and general discharges, and nondisability retirements	251	68.0*	8,967	62.9	291	69.1	1,679	71.5	182	70.0
Separations for reasons of unsuitability, unfitness, misconduct, bad conduct, etc.	48	13.0	3,209	22.5**	14	3.3	206	8.8**	1	0.4
Deaths	4	1.1	97	0.7	8	1.9	38	1.6	5	1.9
Total	369	100.0	14,249	100.0	421	99.9	2,347	100.0	260	100.0

\*p &lt; 0.05

\*\*p &lt; 0.001

### Discussion

Results of this study show that obese patients tend to suffer more than their control counterparts from diseases in the two categories of circulatory diseases and endocrine, nutritional, and metabolic disorders. Rank orderings of categories other than those two consist of the same ones in both samples: mental disorders, accidental injuries, digestive disorders, and musculoskeletal conditions. Of the specific diagnoses, approximately one-third of the obese sample has been hospitalized with a primary diagnosis of obesity. Other specific disorders that represent a large proportion of health problems among obese patients at all ages include hypertension, diabetes mellitus, gout, respiratory symptoms, and gallbladder disorders as well as chronic ischemic heart disease beginning at age 30. All of these conditions have been identified in the scientific literature as obesity related. Also noteworthy is the high percentage among the overweight of hospitalizations for alcoholism, their second-ranked condition, which is the leading health problem in the control sample. Other conditions observed among the ten leading diagnoses in both samples include hernia and cellulitis. In general, it can be concluded that the major difference in hospitalizations between the two samples lies in the preponderance of obesity-related conditions among obese patients and a higher frequency of hospitalizations for mental disorders other than alcoholism among controls.

Other results point up that obese patients are costly to the Navy in terms of numbers of days hospitalized. Of all diagnoses, being hospitalized for obesity as the primary diagnosis accounts for more than 10,000 days or 20.2% of the total days hospitalized. If an average cost of \$200. per hospital day were placed on these admissions across the 11-year period, the total would be \$2,115,000. to treat inpatients for obesity. Being hospitalized for alcoholism represents another preventable expenditure for inpatient medical care, costs also attributable to life style behaviors. In both samples, 10% of the total days are recorded for hospitalizations for alcoholism; this health problem is shown in the top four specific diagnoses for each age interval. Numbers of days hospitalized for both samples also are high for such back conditions as displacement of the intervertebral disc and vertebrogenic pain syndrome. Because of the relatively high percentage of total hospital days observed for these conditions (4.3%), the Navy Medical

Department probably should more aggressively promote its prevention and intervention healthy back programs.

Other comparisons show that obese patients have a higher overall mean number of days hospitalized than that of the control sample, which also has an impact on increasing the costs of medical care among obese patients. In examining other results, three of the ten specific diagnoses have a significantly higher mean for days hospitalized among obese than control patients, especially days hospitalized for alcoholism and cellulitis. Perhaps the healing process for cellulitis is complicated by other disorders, such as diabetes mellitus, another relatively common problem in this obese inpatient sample.

Physical disabilities among obese patients also are costly--approximately 25% of all separations and retirements in this sample are attributed to a disability, primarily for diabetes mellitus, chronic ischemic heart disease, and hypertension. Premature deaths from circulatory diseases among these obese patients constitute another high cost and potentially preventable loss to the Navy.

Another finding to highlight is the relatively high percentage (almost 10%) of 20- to 29-year-old obese patients diagnosed with gout, hypertension, gallbladder disorders, and diabetes mellitus. Because all personnel begin military service in good health, efforts should be made to initiate prevention and weight reduction programs for men in their 20s in order to reduce the incidence of such conditions. Further, the percentage of hospitalizations for chronic heart disease among 30- to 39-year-old obese patients also is quite high and suggests that obesity predisposes to premature coronary heart disease, a finding that corresponds with results published on the Framingham study.<sup>11</sup>

Results of this study support the implementation of the weight reduction programs that have been developed as part of the "Health and Physical Readiness Program." With results in mind of the diagnoses for 20- to 29-year-old obese patients, the timing of assigning individuals to such programs is of importance--before any adverse health effects are manifest.

Findings of this study, for example, emphasize the factor of a predisposition to the premature incidence of coronary heart disease among obese patients, beginning with the 30- to 39-year-old subsample. In assigning overweight individuals to a weight reduction program at an early phase of the excess weight condition, therefore, it seems likely that the number of individuals hospitalized for treatment of obesity will diminish. With a stricter adherence to this assignment of overweight men and women to weight reduction programs, the Navy Medical Department also can expect to reduce the costs associated with obesity-related hospitalizations and physical disability separations. Results of other research, moreover, has shown that loss of weight helps to improve the overall health and physical well-being of participants in Navy weight reduction programs.<sup>19</sup>

Other Navy health promotion programs include the development and screening of video cassettes on nutrition, correct lifting techniques to protect the back, and life style changes; these cassettes have been shown on ships and currently are being evaluated in terms of effectiveness as learning tools and prevention programs. Also to be considered is the implementation during recruit training of a brief course on nutrition, alcohol abuse prevention, and weight control through better eating habits. With the implementation of effective weight reduction as well as health promotion and intervention programs, the future incidence of such disorders should decrease considerably because of the initial healthiness of Navy personnel.

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) This study identified health conditions among U.S. Navy obese male patients (n = 1,610) and examined the costs of obesity as measured by reasons of hospitalization, number of days hospitalized, and effects on career outcome. Results showed that obese patients at three age levels (the 20s, 30s, and 40 and older) tend to suffer more than their nonobese counterparts from gout, hypertension, diabetes mellitus, symptoms of the respiratory system, gallbladder disease, and the two categories of circulatory diseases (e.g., chronic ischemic heart disease beginning at age 30) and endocrine, nutritional, and metabolic diseases. Obese patients had significantly higher means and proportions of days hospitalized as well as physical disabilities than nonobese patients. The numbers of days hospitalized for obesity and alcoholism represented 20.2% and 10.0%, respectively, of the total days. Participating in a Navy's weight reduction program should be urged for overweight personnel before the weight gain increases and adverse health effects are manifest.														
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